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DR. LEONARD A. SELTZER
1870—1945

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AND THE SCIENCES SUPPORTING PUBLIC HEALTH

Since 1825

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IN MEMORIAM

DR. LEONARD A. SELTZER

1870-1945

IT was with great sorrow that Pharmacy records the passing of one of its most outstanding professional pharmacists. Dr. Leonard Seltzer, at the age of seventy-five, died in Detroit on July 24, 1945.

Dr. Seltzer was the son of a pharmacist and as a young man he studied at the University of Michigan College of Pharmacy, graduating in 1892. For a short time he was employed by Parke, Davis & Co. but he soon resumed the practice of retail pharmacy, making it his life's work.

Dr. Seltzer, as a sincere, hard-working, retail pharmacist, was well known for the quality of his professional service but he still found time to participate in many pharmaceutical activities apart from his retail establishment. In 1909 he served as Chairman of the A. Ph. A.'s Section on Practical Pharmacy and Dispensing. In 1914 he was made a member of the Michigan Board of Pharmacy. Dr. Seltzer, served on the Revision Committees of four revisions of the Pharmacopœia, the X, XI, XII, and the XIII and on three N. F. Committees, those for the N. F. IV, V and VI.

Many pharmaceutical organizations and professional groups knew Dr. Seltzer's cooperative spirit and guidance and he was honored by a number of institutions, receiving both an honorary M. Sc. and a D. Sc. degree.

Dr. Seltzer's life and career is ample evidence of the possibilities for community and national service by a retail pharmacist and his may well be the example for many who would serve humanity and pharmacy well.

EDITORIAL

THE NATIONAL DEFICIT OF SCIENTISTS

THE public press is at last giving cognizance to an evil which scientific and professional journals have been exposing for a long time, namely, the short-sighted policy which our government has employed in making impossible the training of scientific personnel. A large number of newspapers and magazines have recently carried editorials and cartoons depicting the dearth of trained young scientists so sorely needed if we are to continue our technological progress and development.

In the early stages of the war undergraduate students in college were permitted to complete their courses but even this privilege was finally taken away. At no time have male graduate students been permitted to proceed with their education unless they were physically unfit. It is from the graduate schools of the country that both our scientists and teachers of tomorrow must come and to abolish graduate schools is in effect to dry up all scientists at the source. The effects of this short-sighted policy will not be evident until the reconstruction period. The Army and Navy which are probably responsible for this policy in the first place have never shown a great deal of concern for anything but their major task, namely, winning the war. It is indeed tragic that someone who could see the overall picture did not long ago take steps to prevent this situation as was done in every other country engaged in the conflict.

The damage, however, is done and we face tomorrow with a handicap which although difficult must be overcome. There are those who see in the Army and Navy specialized training personnel finished scientists; but these men, although expert in some specific technic, lack the broad background so essential for a research worker or teacher in some field of science.

What can be done is to adopt immediately a sensible policy whereby young men of scientific promise are deferred from military service in order that they may continue their scientific training unhampered by military regimentation and secure in the belief that by

scientific endeavor they are best serving their country's interests. In the post-war period, should compulsory military service be adopted, some similar arrangement should be made to guarantee the education of young men of scientific ability. In this connection the recent report to the President by Dr. Vannevar Bush, the Director of the Office of Scientific Research and Development, contains some worthwhile suggestions. Dr. Bush in developing a proposed program for post-war scientific research recommends among other things providing 6000 undergraduate scholarships and 300 graduate fellowships a year for outstanding students. The cost is to be borne by the Federal government and the recipients would constitute a National Science Reserve subject to call into government service in connection with scientific or technical work in time of war or other national emergency. If such a program could be instituted and maintained on a strictly non-political basis great benefits to mankind would result. The danger would lie in the recipients of scholarships being selected on their political affiliations which would result in a total defeat of its purpose. One of the tragedies in American education is that frequently young men and young women of great brilliance and promise are forced by economic pressure to discontinue their education whereas some other person of decided mediocrity continues due to good financial backing.

Equality of opportunity in education should be one of the fundamental privileges in a democracy and yet it is not so in the United States. We have made considerable progress in educating the common man to a minimum level but scientific and technical achievements are produced not by the masses but by those few who receive the ultimate in education. A program which proposes to train all outstanding youths in science, regardless of their color, creed or social stratum, would go far in wiping out the deficit of scientific workers created by our wartime policy in education.

L. F. Tice.

A COMMENCEMENT ADDRESS *

By Robert P. Fischelis. **

CUSTOM decrees that before a group of young men and women shall be finally released from the protective custody of a Faculty which has endeavored to mold them into useful and competent members of Society, they must be subjected to what someone has termed the "final affliction," namely, a Commencement Address.

When the graduation exercises happen to fall on a night near the end of July in hot and humid Philadelphia, it would seem that the distinction of being selected to deliver the Commencement Address should carry with it a mandate to make this ordeal as swift and merciful as possible for all concerned.

I take it that this audience would readily give unanimous consent to such a mandate and I shall proceed accordingly. You will therefore pardon me if I do not refer at length to the splendid manner in which the faculty of this venerable institution has discharged its duty toward these newly created Bachelors of Science in Chemistry, Pharmacy, Biology and Bacteriology. Nor will you take it amiss, I hope, if I fail to dwell for long upon the sacrifices which many of the parents and relatives of these graduates may have made in order to enable them to complete this portion of their education and training for a useful career. We take it for granted that there is due appreciation for all of this on the part of the beneficiaries of the education which this Institution, now in the 125th year of its service to Pharmacy and to humanity, has made possible, even in these war years. And let me point out in passing that while students of this College and their sponsors may have, at times, found it difficult to meet tuition fees and other expenses, the President and Trustees of this Institution have had no easy task in raising the necessary funds to make up the deficit between the income from tuition fees and the actual cost of the education supplied. Such is the task of independent Col-

* Delivered at the Commencement Exercises at the Philadelphia College of Pharmacy and Science on July 24, 1945.

** Secretary and General Manager of the American Pharmaceutical Association.

lege Administrators everywhere today but few have met the necessities of the hour so well as President Griffith with the help of his faculty, alumni and Trustees.

With these brief acknowledgments to the other parties at interest in tonight's exercises I should like now to address the balance of my remarks to you, Graduates of 1945, who are about to part company with the scene and system of your undergraduate education. You are being launched into the great, busy, war-torn and generally upset world where most of you will have to learn to rely more largely upon your own resources or fall by the wayside.

Tonight you are the final result of a series of experiments. For 32 months or more you have been exposed to a variety of teaching and testing by a corps of experts including masters of the physical, biological and social sciences, the humanities and the techniques of Pharmacy, Chemistry, Bacteriology and other skills and disciplines.

You are some kind of a finished product. How good or how bad, time alone will tell.

It will not be very long before you will be undergoing the world's customary tests of your fitness to survive. And the things that will count, the things that will determine your ultimate place among your fellow men, include not only your inherent ability and characteristics, but also your environment, your social contacts, your educational background, your diligence, intelligence, application to the duties and tasks assigned, and, above all, the amount of hard work you are willing to undertake to carve out a career.

Regardless of the specialty for which you have been in training there is much unfinished business that awaits your attention. Neither the problems of the world at large nor of the more restricted scientific world in which you will operate have all been solved, and many of them will still remain unsolved long after you have left this world behind, for Science is indeed the "endless frontier."

Franklin D. Roosevelt wrote as late as last November that "new frontiers of the mind are before us, and if they are pioneered with the same vision, boldness, and drive with which we have waged this war we can create a fuller and more fruitful employment and a fuller and more fruitful life."

You are fortunate in having selected as your Alma Mater an Institution whose administrators believe that professional men and

women have obligations as citizens as well as scientists. It is not only your duty to make a contribution to the welfare of humanity through unselfish service as pharmacists, chemists, biologists and bacteriologists, and in the field of medical care, or elsewhere, but it is also your duty to apply your trained intellect and your social conscience to the molding of a better world.

No doubt your teachers and special lecturers have acquainted you fully with the opportunities for service that lie ahead in the specialized fields for which you have been trained. I can only add that you are completing your training at a most propitious time for quick absorption into industry, teaching, research or further study if these are your objectives. However, I would caution you that the mere completion of an undergraduate course in some specialty and being absorbed into gainful employment is only a part of the true objective of the educated man or woman, although it may be an immediate necessity. It is unfortunate that many who are trained for the sciences and professions become so absorbed in their immediate objectives that they never acquire an understanding of their relationship to the world at large. Let us hope that you will not fall into the habit of bounding your horizons by high walls of selfish interest.

You are graduating at a time when the espousal of isolationism has ceased to be a virtue. We have learned by bitter experience and the supreme sacrifice of too many promising young men that we can no longer hope to live unto ourselves alone. And what is more, we have lived to see the day when from every corner of the earth there comes to us the demand for world leadership. This is not an abstract challenge. It is a series of specific calls for leadership in world diplomacy, in world finance, in world commerce, in world-wide scientific research, and in a world-wide war against disease and all of its disastrous consequences.

The challenge comes then directly to you as a member of one of the professions dealing with the public health and welfare and as a man or woman with a college education.

What is it that you personally can bring to these tasks that the world is leaving on our doorstep?

In the first place you can bring to the solution of any problem the contribution of a disciplined mind. The undisciplined mind holds and acts upon opinion. The disciplined mind is open and constantly seeks the truth. The undisciplined mind acts often unintelligently

upon what "they say." The disciplined mind inquires, "What are the facts?" It is of course much easier to avoid the search for facts than to dig them out. So often they prove that much of what we claim to know just is not so, and that is sometimes disappointing. I implore you to refuse to accept hearsay for fact; to insist upon proof of statements that are open to reasonable doubt, before you determine to make them a part of your knowledge of any subject to be passed on to others.

Unfortunately there has crept into our political system a technique commonly referred to either as "smearing" or "whitewashing," depending upon the objective. It reaches its highest state of development in our national elections, but it has been introduced into controversies of all kinds in our national life including the political aspects of scientific societies, and professional and educational organizations and institutions. It is frequently carried on by professional publicity experts or public relations counsel who conduct their campaigns under high-sounding titles such as Institutes, Research Committees and whatnot. We know the product as propaganda, although we do not always recognize it as such.

One of the tests of an educated person today is the extent of his or her ability to distinguish between inspired propaganda and the dissemination of factual information. Right now in the field of medical care there is much circulation of misleading information which is given a factual flavor by the employment of statistics having little or no relation to the issues involved. It is well for those who are engaged in activities closely related to the practice of medicine to keep themselves especially well informed of the facts that are being developed by the researches of the American Medical Association, the Social Security Board and Committees of Congress which have unequalled access to information from all available sources.

In a democracy we must have free choice of leadership and freedom of expression but the disciplined minds will insist that we carefully distinguish between facts and opinions. Attempts to predicate world leadership or leadership in a profession or in our own communities upon opinion leads directly to the kind of thing we have been trying to exterminate since 1941. As educated men and women you will want to insist that your representatives in the Government, your professional societies and you and your co-workers base all ac-

tions involving matters of policy upon well established or properly authenticated facts.

In the second place you can help to bring to the solution of world problems the sound, ethical concepts that reach their fullest expression in the practice of the healing arts. The Institution whose degree you have received today is essentially a training school for those who wish to devote their lives to certain services which are indispensable to the practice of medicine. Pharmacists, chemists, biologists, bacteriologists and other practitioners of professions closely related to the practice of medicine do not initiate medical care. That is the function of the Doctor of Medicine. He is called upon by the patient to diagnose and prescribe for him. But in both functions the physician requires the assistance of highly trained specialists. You represent an important group of such specialists. You therefore share the physician's responsibility to the patient, for he depends upon your laboratory findings to aid him in making a correct diagnosis, and upon your compounding and dispensing of the proper remedy for effecting relief or cure. Furthermore, he depends upon researches in chemistry, bacteriology, biology and pharmacy for the development of new remedies and new diagnostic tests.

Traditionally the medical profession has never withheld its services from anyone requiring it. You are bound by the same high concept of duty and humanitarianism which governs the medical doctor.

There are codes of ethics among business men but they deal largely with correct rules of conduct in commerce and trade. In medicine we deal not alone with commodities, we deal principally with human beings and actually with the lives of these human beings. That is a relationship which is not generally appreciated in the market place. It calls for more than simple honesty and fair dealing. It calls for constant study and training to remain abreast of the latest developments in a field which is constantly new. Actually, from the time an individual enters any phase of the practice of medicine it becomes his principal objective to put himself out of business, for the final goal of physicians and their co-workers is to eradicate disease, and once that has been accomplished, physicians, pharmacists, bacteriologists and related scientists will hardly be needed.

With such a background of unselfish devotion to the service of mankind your outlook upon the problems of the post-war world is apt to be more liberal, more humane and much more sympathetic than

that of the ordinary man toward adequate control over the forces which have used scientific discoveries and inventions to destroy rather than to benefit human beings.

In one of her recent columns Dorothy Thompson pointed out that it is obvious that a world organization to prevent war must devise some means for international control of scientific formulas. She indicated that although the worst horrors with which Germany threatened the world came out of scientific laboratories, their inventors would probably not be treated as war criminals. On the contrary there is quiet competition in each country to win their services. In discovering the secrets of the universe, these scientists have apparently felt no responsibility for the purpose to which they were put. Of the 100 scientists rounded up by the United States, who, according to Miss Thompson, were working on rocket propulsion alone, most expressed themselves as eager to carry on their experiments in England and America for either war or peace use.

The greatest menace to our world, Miss Thompson continues, is the decline of ethics based on humanism and religious inhibitions, and the divorce of science, technology and economics from humanistic principles and emotions.

I believe the union between the medical sciences and humanistic principles and emotions has not been impaired to any considerable degree as a result of the war. Certainly there is little evidence of any callous disregard of the consequences of a rupture in this relationship. Here, then, we may have a starting point for the application of ethical and humanitarian principles to the control of new discoveries in the interest of the preservation rather than the destruction of mankind. You can help to bring to the discussion and solution of this serious problem the viewpoint of the scientist who deals day in and day out with the problems of medical care.

Finally, there falls upon you as members of one of the professions dealing with the public health, the obligation to be a keen observer, a good recorder and a well-informed disseminator of information in your field. Your basic training has now been acquired. You are ready to accumulate the experience in your field which will make your services increasingly valuable. You must remain mentally alert so that you can master the ever-increasing accumulation of new facts in your field. You must learn to carefully weigh conflicting evidence for there will be more and more people depending upon you for sound

judgment on matters which they know little or nothing about and on which they will consider you to be an expert. The power to observe and the diligence to record observations are of the essence of scientific progress.

If you work with the microscope or with the test tube it is vitally important that you note and record the unusual for you may become the discoverer of something as important to humanity as Penicillin.

If you engage in the practice of Pharmacy keen observation of the health needs of your community will soon mark you as one of its greatest assets. Our health departments and the general public have greater need today of a conscientious and well-informed pharmacist than ever before. With the many conflicting claims of usefulness and specific value of competing brands of medicines coming to the attention of the public by way of the radio, newspapers and magazines, people must turn to someone with sufficient training and experience for unbiased information. Logically the retail pharmacist is that person.

The war against disease and premature death will continue long after the last shot has been fired in the Far East and our armed forces have returned to the pursuits of peace. It is a never-ending war and you have enlisted for the duration. So you will march from now on in the Army which has been recruited and trained to serve humanity in the quest for better health, better living conditions and longer life.

May I express the wish that wherever you may be called and to whatever task you may set your hand, you will have the good fortune to reap a full measure of success and inner satisfaction.

One of the hardest mortar and pestles available is one made of boron carbide (B_4C) with a relative hardness of 9.5 it is far harder than agate which is 6. Using this mortar and pestle one can powder glass without marring the grinding surface. It is particularly useful for grinding hard substances prior to analysis and for use where no contamination of the sample can be permitted as in highly accurate analyses. Mortar and pestle sets of boron carbide cost between $300 and $400.

SULFIDINE IN GLUCOSE SOLUTION

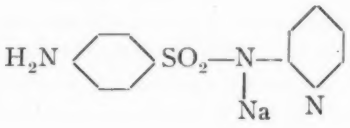
By V. K. Stahl.

(Translated from the Russian pharmaceutical journal "Pharmatsia," Vol. 3, pp. 32-33, 1944, by Edgard Yan Allen, M.Sc.)

SULFIDINE is practically insoluble in water (1:1,000) and therefore cannot be used for intravenous injection per se.

There are known to be many writings dealing with injectable solutions of sulfidine [1] based on the fact that sulfidine is soluble in solutions of caustic alkalies and carbonates. The sulfidine dissolves during heating and in the bicarbonate solution in the same amount that sodium bicarbonate changes into carbonate during heating.

The solution of sulfidine in all these cases may be explained by the fact that its molecules, in alkali media, produce sodium and potassium compounds which are soluble in water:



In medical practice there is also employed a solution of sulfidine prepared according to the method of Planelless.[1]

The use of alkaline solutions of sulfidine in practice leads to several difficulties: in some cases, when the amount of alkalinity is small, the solution after a greater or lesser period of storage becomes unstable; in other cases, when the alkalinity of the solution is high, the intravenous injection of this compound causes a toxic reaction in the human organism.

An injection of sulfidine dissolved in glucose solution does not cause any side reactions.

---

[1] Nautchno-praktitcheskaya informatsia ЦАНИЛ No. 1, 1943. (Information for Scientific Practices of the Central Pharmaceutical Scientific Research Laboratory, Number 1, 1943.)

The method of preparing such a solution has been worked out, on the basis of information indicated in American literature, by the "Chair of Organic Chemistry of 1 M. M. I." [2] (Professor of Merit in Practical Knowledge A. V. Stepanov and his Assistant V. K. Stahl) and is successfully employed by the Clinic of I M. M. I. in treating many infectious diseases. Dr. Paramonov, in particular, injects this solution intravenously in treating several diseases of the brain.

The solution of sulfidine is explained by the formation of a soluble glucoside. This product is prepared according to the following formula:

Sulfidini	10.0 gm.
Sol. Glucosae 50%	100.0 gm.

To a boiling solution of glucose (the heating is carried on upon an electric hot plate, sand bath, etc.) is added the sulfidine, not in the entire quantity, but in parts. To avoid boiling off the water the solution is carried out in a flask fitted with a reflux condenser.

The pharmacy of the Clinic of I M. M. I. (Pharmacy Director A. I. Samohvalova) makes the solution in an open flask, without the use of a reflux condenser, and adds the boiled-off water in the following manner:

80 grams of water are poured into a flask and to it are added 50 grams of glucose. The contents are heated to boiling. When the glucose dissolves, the first portion—2 grams of sulfidine are brought into the flask without discontinuing the heat. After the solution becomes clear one (1) gram of sulfidine and 10 grams of water are added. Then successively, each time after the previously added portion has dissolved add one (1) gram of sulfidine; then twice one (1) gram sulfidine and 10 grams of water each; finally the remaining 4 grams in one-gram portions each.

The entire process of dissolving the ingredients in this preparation takes place during a period of one (1) hour and twenty (20) minutes.

The flask is now weighed. The solution should weigh 110 grams. If the weight is less than this amount the necessary quantity of boiling water is added.

---

[2] 1 M. M. I.—Probably the abbreviation for the "First Moscow Medical Institute".

The solution is filtered and then subjected to sterilization for thirty (30) minutes at 100° C.

For solution it is imperative to employ glucose which satisfies all the requirements of the Pharmacopœia Φ VII (current Russian Pharmacopœia) and recently boiled, distilled water.

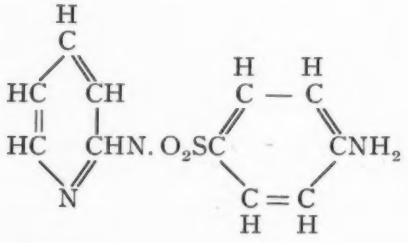
It is self-evident that, upon observation of general principles, the details for preparing this solution may be changed.

At the present time the dosage for administering sulfidine in glucose solution by mouth has not yet been worked out. For intravenous injection twenty (20) ml. of solution are given at one time.

According to observations of the highest authority on organic chemistry (at I M. M. I.) this preparation did not decompose after being stored for a period of two (2) weeks.

Translator's Notice.

"Sulfidine" is known in American pharmaceutical and medical practice as "Sulfapyridine." The Russian chemical terminology for this compound is 2-para-aminobenzolsulfamidopyridine as compared with 2(para-aminobenzenesulfonamido) pyridine used for naming this medicament in the United States. The Russian chemists write the following structural formula for this product:



Russia is one of the countries in which this compound had been independently synthesized. The others are the United States and India.

Russian manuals on prescription writing state the following in reference to this drug: "Sulfidine (sulfidinum) is structurally distinguished from white streptocide in that one hydrogen atom of the

sulfonamide group is replaced by pyridine. White or slightly yellow crystalline powder, slightly soluble in water (1:1,000); easily soluble in solutions of caustic alkalies, carbonates, and in dilute mineral acids. It is used in croupous pneumonia and all types of pneumococcic infections; also in septicemia and meningococcic infections. Internally—in tablets or powders together with sodium bicarbonate, in milk or syrup. Intradermally—in conjunction with a neutral oil. Schedule for the treatment of croupous pneumonia: Initial dose 2 gm.; then for a period of 48 hours 1 gm. every 4-6 hours; on the third day of treatment, 4 gm.; on the fourth day, 3 gm.; on the fifth and sixth days, 2 gm. in 24 hours. Children's doses: 0.1 gm. for each kilogram of body weight every 24 hours (4-6 doses) until the temperature falls; after the temperature falls, for a period of 3-4 days, half the previous dose. In treating with sulfidine magnesium sulfate is counterindicated in order to avoid the development of sulfohemoglobinemia. One should also avoid treatment with ultra-short wave rays diffused through quartz, and frequent Röntgenologic examinations. Copious drinks are recommended. A typical adult prescription is:

℞

Sulfidini 0.5 gm.

D. t. d. No. 20

S. Take according to the physician's schedule.

Since the article requires the use of glucose which meets all the requirements of the Seventh Edition of the Government Pharmacopœia of the U. S. S. R., I am including a translation of its monograph from that volume which is as follows:

Glucosa.

Russian: "Gliukoza" English: Glucose

$C_6H_{12}O_6$ Mol. Wt. 180.10

Saccharum amylaceum Vinogradny sahar (Grape sugar)

White crystals or a fine crystalline powder which is odorless, has a sweet taste, is soluble in 1.5 parts of water and 50 parts of alcohol.

10% of an aqueous solution, prepared from glucose which had previously been dried at 105° C., upon the addition of one drop of ammonia solution rotates the plane of polarization from 50° to 53° at 20° C. Upon heating 1 cc. of an aqueous solution of glucose (1:20) with 5 cc. of Fehling's solution a red precipitate separates out.

Aqueous and alcoholic solutions of glucose (1:100) when slightly heated must be clear and colorless; an aqueous solution should not change the color of blue and red litmus papers (free alkalies or acids).

A solution of glucose (1:20) should not give reactions to tests for salts of heavy metals, calcium salts, sulfuric and hydrochloric acids. One (1) gram of glucose is mixed with 15 cc. of sulfuric acid and is allowed to stand for a quarter of an hour with frequent stirring of this mixture. The acid may be colored yellow but not a dark or black color (sugar and other organic substances).

0.5 gm. of glucose is dried at 105° C. A loss in weight of not more than 0.005 gm. is allowed.

Upon burning and ignition of 0.2 gm. of glucose a residue of not more than 0.001 gm. should be obtained.

Stored in well closed jars in a dry place.

Note: The ammonia solution used for polarization should contain 9.9-10% ammonia (NH_3) by weight and should have a specific gravity of 0.959-0.960 at 15° C. Distilled water is employed in making this solution.

THE INTER-AMERICAN PUBLIC HEALTH TRAINING PROGRAM

By Charles E. Shepard, M. D. *

FOR the past few years, a growing number of Latin American physicians, nurses, sanitary engineers and laboratory specialists coming to United States medical and other academic centers have borne witness to an impressive cooperative development of the Western Hemisphere's public health movement.

The turning point in the history of hemispheric public health was marked by the Third Meeting of American Foreign Ministers, held at Rio de Janeiro in January 1942. A resolution adopted by the ministers, calling for health and sanitation measures on a hemispheric scale, committed the American republics to the principle that good public health is a self-evident duty of government as well as a prerequisite to economic progress.

Dictating speedy promotion of public health facilities were urgent factors, strategic and economic. For, in the face of a threatened invasion of the hemisphere, environmental improvement of sanitary conditions in areas around military and naval bases, such as provision of adequate safe water supplies, control of endemic diseases and sewerage disposal, became a matter of great military urgency. Of equal importance was the health of the labor force of the other Americas because, with the severance by the enemy of vital supply lines from the Far East, the success of the United Nations war production program hinged on the ability to find, without delay, substitute sources of critically needed raw materials. Maximum output from those new sources was, in turn, contingent upon the ability to keep production workers physically fit. Finding herself directly interested in the welfare of Latin American populations, consequently, the United States has proceeded to cooperate with the other republics in the intricate task of raising their health standards. Nineteen of the republic, including the United States, now participate in this program.

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* Senior Surgeon (R) U. S. Public Health Service; Director, Training Division, Office of Inter-American Affairs.

In its initial stages this coalition against preventable diseases was based chiefly on considerations of military strategy. However, many of the long-range economic benefits accruing to all parties concerned as a result of the health and sanitation measures soon became dramatically apparent. With an imagination sharpened by the catacylsm of war, Americans, North and South, began grasping the import of certain geopolitical facts which in the past they have been slow in realizing. They began to understand that the minerals, woods, and crops from Latin America, so vital to war production, could contribute to a mutually profitable peacetime commercial exchange.

United States financial and technical assistance to the public health work in the other Americas is handled by the Institute of Inter-American Affairs, a corporate entity of the Office of Inter-American Affairs. Important phases of this assistance are the cooperative public health services and food supply programs set up in the individual countries and the training program, carried out under the supervision of the Institute's Training Division.

The Cooperative Public Health Services ("Servicios") are operated jointly by field representatives of the respective national governments and of the U. S. The purpose of the Servicios is to help introduce modern and efficient public health methods through the establishment of mass prophylaxis services, health centers, dispensaries and a variety of sanitary engineering projects. At first, the programs were established in places of most strategic value to the war effort. Most of these cooperative programs were started in 1942 and extended to 1948. In the original agreements, the United States contributed a larger share than the other countries; however, when these agreements were extended, the other governments contributed substantially more than the U. S., whose part in the expenditures is diminishing progressively while those of the other governments increase.

As the progressive expansion in Latin America's public health facilities is bound to accentuate the demand for a larger number of specialists to operate them, a deliberate effort has to be made to help expand the ranks of personnel versed in modern public health practices. This is the function of the Training Division of the Institute of Inter-American Affairs.

To accelerate the formation in all the participating countries of cadres of up-to-date public health specialists and teachers in the many

phases of the vast subject, recourse was had to the educational facilities of the United States. By December 31, 1944, 384 scholarship grants had been made under the program of the Training Division, with the awards distributed as follows:

PUBLIC HEALTH (disease prevention and control)	172
SANITARY ENGINEERING	73
MEDICAL SCIENCES	65
MISCELLANEOUS	74

Most of the scholarships are in the field of public health and sanitary engineering, but courses are offered also to laboratory technicians, nurses, dentists, statisticians, and others.

Prospective fellows are selected by consultation between the Institute's chief of party in a given country and that country's health authorities. Criteria which determine selection are the professional attainment of the applicant, his talent, qualities of leadership and his interest in the welfare of his country.

A determining factor is the specific needs of each country in matters of public health. For instance, in the case of Haiti, special attention is given to the strengthening of the republic's machinery for the control of malaria and yaws. In connection with Brazil's efforts for the development of the Amazon areas, emphasis is placed on rural public health. In Honduras, whose major health problem is the prevalence of malaria, candidates for fellowships are largely selected among specialists in the control of this disease. Chile is one of the few American countries not plagued by tropical diseases but it has an extraordinarily high tuberculosis death rate. Therefore, a great percentage of our Chilean guests are placed in hospitals, sanitoria, and other institutions specializing in tuberculosis control and treatment.

The case of Mexico offers another example of our efforts to mesh the Training Program with the inter-American health work: in connection with the anti-tuberculosis and anti-venereal disease campaign now under way in the United States-Mexico border region, emphasis in the selection of fellows from Mexico is placed on specialists in those two fields.

The average stay of a trainee in this country is one year, of which, as a rule, about two months are devoted to practical work in hospitals, sanitariums and laboratories or in the various branches of the health departments of our big cities, such as sewage disposal

plants, bureaus of statistics and welfare and food control. The details of each trainee's schedule of studies are carefully worked out by the Training Division and the trainee himself.

Experience has shown that the average trainee, upon his arrival in the United States, not only has to overcome language barriers but also needs help in adjusting himself to his new environment. His instruction in English is usually so conducted as to serve also as an introduction to our social customs.

Trainees who know little or no English are given intensive training in the language at one of the United States institutions specializing in teaching foreign students.

Representative of the methods used to guide the trainee in this period of psychological and intellectual orientation is the work done by the English Language Institute of the University of Michigan, Ann Arbor.

Actual classes, at which modern pedagogical aids such as individual voice recordings and motion pictures are used profusely, are only part of the curriculum. After school hours, students and instructors move to English House, a roomy, rambling structure with deep easy chairs, which is operated under the auspices of the University. It was formerly a fraternity house, taken over for the duration of the war. It is directed by Professor Leo Rockwell and Mrs. Rockwell, both outstanding teachers of English and both great admirers of the cultures of Latin America, though they do not let this last trait interfere with a strict enforcement of the "ONLY ENGLISH" rule to which residents and visitors are pledged. With a capacity of 30 male boarders, English House also serves as the gathering center and adopted home for all the other members of Ann Arbor's Latin American colony.

Since its inception, three years ago, English House has been constantly experimenting with methods designed to offer foreigners a real opportunity to learn English rapidly, with emphasis on practical methods.

According to current routine, each dinner table seats six persons, one of whom is an instructor who sees to it that conversation among the group is carried on only in English and that there is plenty of it. Incidentally, English House menus, the product of a culinary compromise, are planned to meet the tastes of the Latin Americans and at the same time to prepare them for United States cooking. After

dinner, students and instructors continue their discussion in the lounge of English House.

To break the monotony of this routine, Friday evenings are devoted to social and recreational activities. The Friday events are attended by outsiders, and consist of dancing, occasional talks by either instructors or students and group singing. The song repertoire consists chiefly of folk songs, North and Latin American—the one instance where the students are deliberately encouraged to use their own language. After two months of such a linguistic diet, the student is ready to proceed with the professional portion of his stay in the United States.

The foremost United States post-graduate medical centers cooperate with the Office of Inter-American Affairs in the training of Latin American professionals. The majority of our fellows are registed for regular post-graduate courses in Public Health and Sanitary Engineering given in such universities as Johns Hopkins, Harvard, Michigan, Yale, North Carolina and Columbia.

The remainder receive their training in a variety of related projects, too numerous to be listed here. They range from studies in social work (National Catholic, Fordham, Chicago and St. Louis Universities) to maternal and child welfare (Children's Bureau, United States Department of Labor). Altogether more than a hundred institutions throughout the United States have received these people for special types of professional programs.

The Director of the Training Division visits at regular intervals all the centers where the Latin American trainees study. Other representatives of the Division also periodically make similar visits, the object of which is to give the trainees an opportunity to discuss their personal and professional problems. Experience has shown us that many of the trainees, out of courtesy, thoughtfulness or pride, are reluctant to bring up certain matters if not encouraged to do so. Typical are health and curriculum problems. And although detecting the sources of trouble is the hardest of our tasks, because it often borders on prying into the personal affairs of our trainees, we feel fully rewarded when arrangements with a medical or dental clinic, made by our office, or a change in the schedule of studies succeeds in restoring the trainee's tranquillity of mind. In several instances we discovered that some bad news from home—a grave illness of a member of the trainee's immediate family, for instance—interfered with

the progress of his study. Our usual procedure in case of a serious emergency is to suggest that he go home to arrange his affairs with the understanding that, on his return to the United States, we will help him to readjust his program of studies.

During three years of association with our Latin American guests, we have formed a high opinion of the personal and professional caliber of these professional men and women. They are full of zeal for their studies, have a profound understanding of the importance of their social function, and are imbued with an enthusiastic desire to use their knowledge in the service of their fellow countrymen.

During my visits to the trainees, I have been repeatedly struck by an unexpected aspect of the training program. Although these young men and women have come to the United States to learn, their presence also serves as a valuable and stimulating lesson to their United States instructors and colleagues. From the professional point of view, some of the trainees are outstanding authorities on diseases prevailing in their countries. Their experience, which they are eager to share with their United States colleagues, is a contribution to the welfare of United States troops fighting in tropical climates. The scientific papers of other trainees have been received with great interest in United States medical publications and associations.

In the broader field of cultural interchange, the mutual benefits from these day-to-day contacts among intellectuals from the other Americas and their United States counterparts are obvious. Less foreseen, but equally important is the relationship, and often friendship, developing among nationals from the other Americas themselves, thus making United States campuses multilateral clearing houses for scientific and social ideas on a hemispheric plane. Of immediate consequence to the future of public health in Latin America is the fact that, living for a year in this predominantly public health world, the trainees have an unexcelled opportunity to get a first-hand picture of the history and vicissitudes of the movement everywhere in the hemisphere, of the mistakes that have been made and remedies applied. The conclusions they draw from this information provide them with many shortcuts applicable to conditions in their countries.

To the people of Latin America the long-range benefits, in practical terms, mean a healthier labor force with a reduced rate of absenteeism resulting from illness, thus leading to cheaper and greater

production, a better ability to cope with major economic development problems, including the movement of great masses of workers to under-developed areas, and the raising of their purchasing power in general.

The presence of several hundred foreign professional persons stimulates a sympathetic interest in our cultural and technological achievements. We have given and are giving leaders and potential leaders of the Americas a real opportunity to get intimately acquainted with our scholars, institutions, art and literature, and so have counteracted many misconceptions created in some minds by hostile propaganda. In the economic field, physicians from Latin America are using and appreciating United States technological methods in medicine, surgery, engineering and public health.

A most gratifying feature of our relationship with the trainees is the fact that it rarely terminates with their departure from the United States. Yuletide season brings to the Training Division stacks of greetings. Letters from former trainees all over the hemisphere, telling what has happened to them since their return home, reach us regularly. I was particularly moved by the reception given me at the Santiago airport, on my recent arrival in the Chilean capital, by a large group of former guests who had been waiting to give me a hearty welcome. It fills us with great satisfaction to learn that a good number of them have achieved positions of prominence. About 90 per cent of them have taken jobs for which they were trained in the United States.

By 1948, about 700 professional men and women from all over the Americas will have participated in the program. Evidence abounds that, stimulated by their experience in the United States, they will work tirelessly to elevate the scientific standards of their professions, creating new health centers, hospitals and laboratories, multiplying sanitary installations and fighting disease and ignorance with every means known by modern science. Many of them will devote full or part time to the dissemination of their knowledge through existing training centers or those that are being developed in ever greater numbers. The combined impact of their work will help overcome one of the greatest obstacles to the advancement of public health—the shortage of highly trained and forward-looking public health leaders.

SELECTED ABSTRACTS

Simple Local Treatment for Throat Infections. H. H. Rosenthal. *U. S. Naval Med. Bull. 45,* 75 (1945). Penicillin lozenge therapy was found to produce striking results in the treatment of follicular tonsillitis and ulcerous Vincent's angina. The response is stated to be superior to that obtainable with a triple dose of penicillin by injection. The formula is as follows:

	gm. or cc.
Sodium citrate	2.0
Starch	20.0
Gelatin	40.0
Sucrose	60.0
Distilled water	140.0
Penicillin calcium	20.0 (100,000 units)
Oil of peppermint	6 minims

The first four solid ingredients and the water are boiled together, with constant stirring, for three minutes. The mixture is then cooled to about 80° F., the penicillin calcium added with stirring, and poured into a waxed mold, covered, and placed in a refrigerator.

A standard wooden container for slides, 8 x 16 x 2 cm., well waxed on the inside, may be used as the mold. The mass is divided into 40 lozenges, each containing 2,500 units of penicillin.

The patient is instructed to allow the lozenge to dissolve slowly on the tongue; the medication dissolves in about fifteen minutes. One lozenge is administered hourly.

Excellent results in the treatment of severe pharyngitis and mild forms of tonsillitis were achieved through the administration of a chewing wafer containing a sulfonamide mixture of the following composition:

	gm. or cc.
Sulfanilamide	2.0
Sulfathiazole	4.0
Sodium bicarbonate	2.0
Paraffin wax	16.0
Oil of peppermint	10 minims

The first three ingredients are mixed and triturated to a fine powder, and are added with constant stirring to the melted paraffin and oil. The mixture is poured into a mold and then divided into 20 wafers, one of which is chewed like gum every two hours.

The Preparation of Ointment of Wool Alcohols. I. Michaels. *Pharm. J. 100,* 279 (1943). An ointment prepared according to the directions of the Sixth Addendum to the B. P. was hard and granular. The following formula yielded a satisfactory product: wool alcohols,, 60 gm.; hard paraffin (m. p. 51° C.), 170 gm.; soft paraffin (m. p. 45° C.), 170 gm.; liquid paraffin, 600 gm.

The hard paraffin, preferably shredded, was melted at not above 65° C. The wool alcohols in small pieces were added, and heating at the same temperature was continued, with stirring, until melting was complete. The soft paraffin was added, heating being continued below 60° C. until it was melted; the mass was then stirred. The liquid paraffin, warmed to about 50° C., was then added with stirring.

The product may either be transferred to slightly warmed containers and allowed to cool undisturbed, or be stirred until cool.

Ointment of Salicylic Acid. If salicylic acid is to be incorporated into ointment of wool alcohols, it must be added to the melted base, and the ointment must be stirred until cold. On a small scale, the acid may be incorporated into the warm base by levigation on a tile, or trituration in a warm mortar.

Hydrous Ointment. The use of an ointment mill was found to yield a product superior to those prepared by any other means. The substitution of light liquid paraffin for the liquid paraffin specified in the official formula for ointment of wool alcohols gave satisfactory results. The following formula was used: wool alcohols, 60 gm.; hard paraffin, 240 gm.; soft paraffin, 100 gm.; light liquid paraffin, 600 gm.; distilled water, 1000 gm. The regular procedure of mixing was followed, and while still warm the ointment was passed through the mill, preferably twice.

The following formula yielded a satisfactory hydrous ointment after passage through a warm homogenizer: wool alcohols, 60 gm.; hard paraffin, 170 gm.; soft paraffin, 170 gm.; liquid paraffin, 600

gm.; distilled water, 1000 gm. The product should have a temperature of about 40° C. when it is placed in the homogenizer.

On a small scale this ointment may be prepared by adding water at about 55° C. to the melted mixture of paraffins and wool alcohols at the same temperature contained in a warm mortar, followed by vigorous trituration.

Stability of Hydrous Ointment. Samples of hydrous ointment prepared in an ointment mill showed no signs of separation after four hours of storage at 37° C., but samples prepared by the use of a homogenizer and a mortar were less stable. No signs of separation were noted in samples exposed to this temperature for two hours.

Ointments prepared according to the formulas given showed no signs of separation after storage for four months at room temperature (about 15° C.).

Buffer Precipitation Test for Malaria. E. Bogen. *U. S. Med. Bull. 45,* 47 (1945). In 1939 Wolff reported that normal human blood serum added to buffered distilled water at pH 7.7 remains clear, but blood serum from malaria patients becomes cloudy. From this observation has been developed a buffer precipitation test which is stated to be positive in nearly all cases of malaria, except during actual paroxysms, and rarely yielding a false positive test, except in kala-azar, typhus fever, leptospiral jaundice and some forms of liver disease.

The technic of performing this test is described in detail. The reading is determined by comparison with a control from 30 to 120 minutes after the addition of the serum. Data are presented on more than 3,000 such tests performed at a naval hospital. A positive precipitation test is not considered as conclusive as a positive blood smear for malaria, but a negative finding may be even more reliable. The precipitation test has the advantage of being much less time-consuming than microscopic examination. It is recommended that doubtful or positive precipitation tests should be corroborated by blood-smear examination.

The author states that further study is necessary to evaluate the utility of the buffer precipitation test in following the course of malarial disease, in guiding the therapy and in certifying cure.

Some Practical Points. R. Presslie. *Pharm. J. 100, 279* (1945). *Lard Fatty Acids.* Stearic, palmitic and oleic acids were obtained from lard by treatment with an excess of aqueous alkali, followed by mineral acid and washing with water. The oleic acid in the mixture (content 60 per cent) was converted to its stereoisomer, elaidic acid, by the action of nitrous acid.

The resulting product, termed "lard iso-acids," is a hard yellow substance similar in appearance and in melting point to cocoa butter. Tannic acid suppositories containing the former were found to be satisfactory, and because the "iso-acids" have a higher coefficient of expansion than cocoa butter, they were easier to remove from the mold.

The replacement of cocoa butter in lipstick formulas by the "iso-acids" was found to improve the spreading qualities of the product. The incorporation of 5 per cent of the "iso-acids" in shaving cream increased the viscosity of the lather.

Benzyl Benzoate Emulsions. The following formula was found satisfactory, yielding a white emulsion of about the viscosity of milk and which is more rapidly absorbed than a Lanette wax SX emulsion: benzyl benzoate, 25 mils; Turkey red oil, 10 mils; water, to 100 mils. The ingredients are simply shaken together in a bottle. Although the product creamed rather quickly, the emulsion could be restored by one shake.

Methyl Salicylate Emulsion. A milk-like, non-greasy emulsion of methyl salicylate was prepared by shaking together 25 mils of this ester, 10 mils of sulfonated oil and 65 mils of water.

Acriflavine Emulsion. A w/o emulsion of acriflavine was prepared according to the following formula: acriflavine, 0.1 gm.; cod liver oil (as an adjuvant for burn therapy), 32 mils; vaseline, 32 gm.; sodium lauryl sulfate, 3 gm.; water, to 100 mils.

The vaseline and oil were mixed together in a mortar, and to them the aqueous solution of acriflavine and sodium lauryl sulfate was added in small portions with constant trituration.

A suggested formula for an acriflavine emulsion of the o/w type contains 0.1 gm. of this substance, 40 mils of cod liver oil, 5 gm. of Lanette wax SX, 2 gm. of sodium lauryl sulfate and 53 mils of water.

The wax and oil were heated together, and to them was added the wetting agent and dye, previously dissolved in warm water. The product was stirred until cool.

Ointment Bases. The author states that 5 per cent of sulfonated castor oil or 1 per cent of sodium lauryl sulfate added to any variation of the official formula for ointment of wool alcohols greatly improves the stability of the hydrous preparation.

He suggests the following formula for an ointment base of the o/w type: spermaceti, 15 gm.; soft paraffin, 12 gm.; liquid paraffin, 12 mils; sodium lauryl sulfate, 1 gm.; water, 60 mils.

The first four ingredients are melted together. The water may be added either while the mixture is warm, in which case the product is stirred until cool; or the oily mixture may be allowed to cool and the water incorporated at room temperature when required.

Increasing and Prolonging Blood Penicillin Concentration Following Intramuscular Administration. J. Bronfenbrenner and C. B. Favour. *Science 101,* 673 (1945). Studies conducted on six patients indicated that the restriction of fluid intake to 1,500 cc. and the salt intake to 3 gm. per day doubled the penicillin blood level following the intramuscular administration of 20,000 units of penicillin every two or three hours.

Other authors have reported that the simultaneous administration of *p*-aminohippuric acid delays the excretion of penicillin in the urine. Since benzoic acid is detoxified in the normal liver by conjugation with glycine to form hippuric acid, the authors investigated the effect of orally administered benzoic acid upon the blood and urine levels of penicillin, the latter being determined two hours after the intramuscular injection of the antibiotic.

It was found that the oral administration of about 2.5 gm. of benzoic acid every four hours to a patient on an unrestricted diet doubled the penicillin blood level which was observed when normal fluid intake and diet were allowed.

The combination of a low fluid intake and low salt diet plus benzoic acid resulted in a four- to eight-fold increase in penicillin blood levels, with a prolonged effective blood concentration. This procedure decreased the two-hour urinary excretion of penicillin to 22 per cent, whereas the figure was 56 per cent with an unrestricted diet and no benzoic acid.

Method for Local Administration of Penicillin. E. C. Cutler and W. R. Sandusky. *Surgery 16,* 937 (1944); through *U. S. Naval Med. Bull. 45,* 188 (1945). Under sterile conditions penicillin sodium is mixed with dehydrated plasma in the proportion of from 10,000 to 20,000 units of the former to 0.2 gm. of the latter. The plasma is reduced to a light fluffy powder by stirring, the penicillin is added, and further gentle stirring produces a homogeneous mixture.

Complete hemostasis of the wound surface must be obtained prior to the application of the mixture by means of a powder insufflator. The medicament goes into solution immediately after it is applied, and the tissues assume a yellow color. Two-tenths of a gram of plasma is sufficient to produce a fine frosting on a surface 100 sq. cm. in area.

A new absorbent for CO_2 called "Caroxite" has been developed by Fisher and Eimer and Amend. It absorbs 25-40 per cent more CO_2 than previously available solid absorbents and does so rapidly and completely. A progressive color change when packed in an absorption bulb indicates when the absorbent is "spent".

Caroxite is particularly useful for combustion analyses due to its efficiency and long life. It is interesting to note that in the chemical control of pig iron production for one year some 64,000,000 various analyses were performed.

SOLID EXTRACTS

The inclusion of a wetting agent greatly increases the efficiency of water in extinguishing phosphorus fires. Ordinary liquid soap 1 part with 5 parts of water is the mixture that has been recommended. Solutions of copper salts are far less effective.

AJP

"Build a better mouse trap and the world will beat a path to your door" has been taken both literally and seriously by a Rochester firm. They have developed an ultra-modern rat trap which based on rat psychoanalysis lures the rat into an electrically operated escape-proof jail and then without benefit of legal counsel or clergy electrocutes him. After death he is dumped unceremoniously into a basket (no flowers) for disposal.

AJP

The use of DDT for the widespread destruction of insect pests should be instituted with caution. Government experiments have shown it to be not only destructive to many useful insects such as bees but also fatal to birds and fish when improperly used. Another point frequently overlooked about this insecticide is that it is a poor repellent, mixtures of indalone and dimethyl phthalate being many times superior.

AJP

A single injection of 150,000 units of penicillin as the calcium salt in beeswax and peanut oil has been shown to be practically 100 per cent effective in the cure of gonorrhea. Evidence is also accumulating that shows this treatment to be effective also in pneumonia, impetigo and other infections caused by penicillin susceptible organisms.

AJP

Pure crystalline vitamin D_2 is now sold by the Winthrop Chemical Co. to food and drug manufacturers. It has a potency of 40,000,000 U. S. P. units per gram. It is also available in corn oil solution at different concentrations.

The use of estrogens plus aluminum hydroxide has been suggested as a means of preventing kidney stones. The theory underlying this therapy is that the estrogens increase the citrate concentration of the urine and thereby reduce the calcium concentration while the aluminum hydroxide diverts phosphate excretion from the urinary to the intestinal tract. This type of experimental therapy is now under clinical trial.

AJP

The knowledge that penicillin behaves like an organic acid whereas certain other microbiotics act like bases has led to their possible combination as extremely effective salts. Little by little man's conquest of infection continues until some day infections will be rarely of serious concern.

AJP

The possibility of using tryptophane, one of the essential amino acids, as a means of retarding tooth decay is of interest. Tryptophane has been shown to retard greatly the hydrolysis of starch by saliva, the rate of starch hydrolysis by saliva having been previously correlated with the extent of dental caries.

AJP

One hundred million working days are lost to American industry each year on account of the common cold at a cost of about a billion dollars. A number of facts concerning factors predisposing one to colds have been published recently by J. H. Kler. Draughts, desk work and week-ends all seem bad. The latter is probably due to fatigue; at any rate the highest incidence appears on Mondays.

AJP

The use of PABA (para-aminobenzoic acid) in the treatment of spotted fever has been suggested and it is now under clinical trial. It is known to be useful in typhus fever and since spotted fever (Rocky Mountain fever) is also produced by rickettsia it was tried on animals with striking results. If PABA is effective in human cases it will provide the only means of therapy for this infection transmitted by ticks which has been developed.

BOOK REVIEWS

Reports of the Progress of Applied Chemistry. Vol. XXVIII. 1943. 517 pages. Issued by the Society of Chemical Industry, 56 Victoria St., London, S. W. 1.

This volume, the twenty-eighth of a series, is issued annually. It summarizes the literature published for the year in the field of industrial chemistry. Each chapter covers a different subject and is presented by an authority on that particular phase. Some of the subjects covered include fuel, iron and steel, ceramics, plastics, pulp and paper, leather, rubber and related subjects. To those engaged in these fields it is a valuable aid in summarizing the published literature.

M. O. HOLLAND.

The Chemical Formulary. By H. Bennett, Volume VII. 1945. 474 pages. Chemical Publishing Co., Inc., Brooklyn, N. Y. Price: $6.00.

The Chemical Formulary is well known for its valuable collection of formulas. This seventh volume contains new ideas, new processes and new formulæ which have been chosen for universal usefulness. The material throughout has been cross-indexed for rapid reference.

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M. O. HOLLAND.

The "ABC" of Vitamin D Therapy

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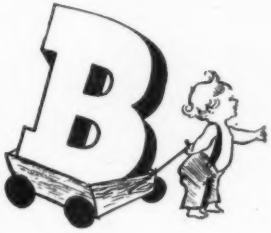

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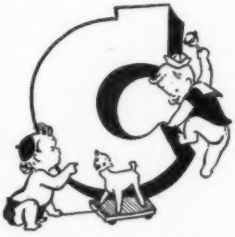

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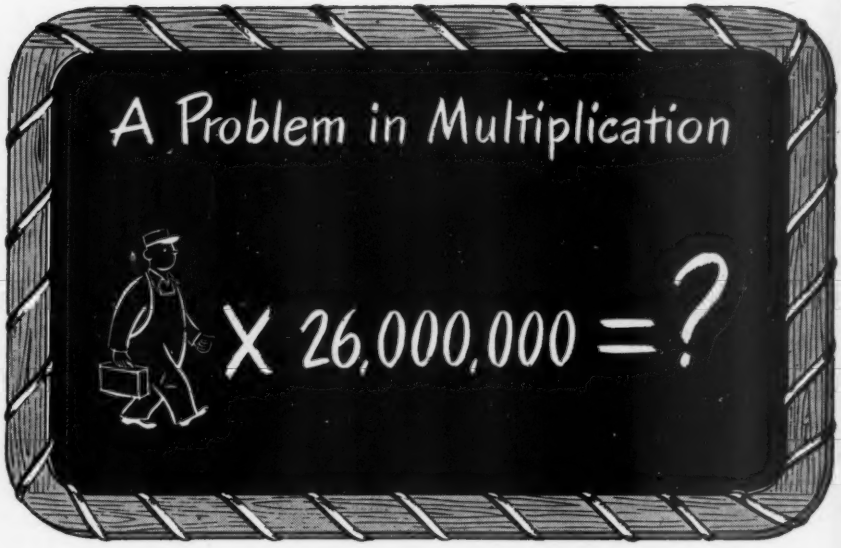

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The American Journal of Pharmacy is the oldest continuously published scientific periodical of its kind in America, having been established by the Philadelphia College of Pharmacy in 1825. After the original issue there were three other preliminary numbers until 1829, when regular publication began. From then until 1852 four issues were published annually, with the single exception of 1847, when an additional number appeared. Six issues a year were printed from 1853 to 1870, at which time the Journal became a monthly publication.

Former Editors of the Journal have been: Daniel B. Smith, 1825-1828; Benjamin Ellis, 1829-1831; Robert E. Griffith, 1831-1836; Joseph Carson, 1836-1850; William Procter, Jr., 1850-1871; John M. Maisch, 1871-1893; Henry Trimble, 1893-1898; Henry Kraemer, 1898-1917; George M. Beringer, 1917-1921, and Ivor Griffith, 1921-1941.

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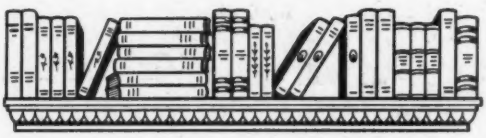

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